# The Air Line Pilot

March, 1953

## Inadvertent Prop Reversing

## Large Aircraft Operation

Meeting with Douglas (Page 10)

Captain Charles Daudt, AAL, brings some facts to light on

# Inadvertent Propeller Reversing

**The coordinator of ALPA efforts to Eliminate Inadvertent Propeller Reversing after months of study, comes up with some solid recommendations to beat the problem.**

It was because of a drastic need to protect against inadvertent reversals that ALPA appointed a special committee, consisting of Captain Charles Ruby and Captain Charles Daudt, to work with CAA and the industry to produce recommendations to eliminate the hazard. The following recommendations are the result of having toured with the AA-Industry Reversible Propeller Investigating Committee which held conferences and actual aircraft inspections at Douglas, United Airlines, Lockheed, Consolidated Vultee, American Airlines, Martin, and Hamilton Standard. Numerous conferences were held with the CAA, CAB, ATA, NACA, operators, airframe manufacturers, and propeller manufacturers. In addition there was advice and coordination with the ALPA Engineering Department, recommendations from individual pilots, Local Engineering and Air Safety Committees, and ALPA's Central Air Safety and Engineering Advisory Committee.


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W. Johnston, Editor


The resulting recommendations concern only the Hamilton Standard Reversible Propeller. This particular propeller was investigated first because at least ninety-five percent of the aircraft operated by domestic carriers with reversible propellers are equipped with the Hamilton Standards. The Curtiss Electric Reversible Propeller was to be investigated secondly.

The ALPA Committee reached several conclusions.

ALPA's specific recommendations are as follows, under the headings of Hydraulic Governor, Hydraulic Propeller, Electric Circuit, Electric Circuit Installation, Throttle Pedestal Design, and Warning Lights.

**Hydraulic Governor.** Install the ALPA proposed High Pressure Hydraulic By-Pass System (the Low Pitch Relief Valve System). This may be accomplished by replacing the present governor base casting and by running an additional solenoid lead or cable to the cockpit.

This system was originally conceived as indicated in Fig. 1 (page 3.) It was ALPA's desire to install an overall safety device in the propeller dome. Since we have been unable to devise a means of by-passing reversing pressures there, we have come as close to the dome as possible by placing it at the governor outlet of the reversing pressure line to the propeller. This location is also as far downstream as possible from the mechanical, electrical, and hydraulic systems. All of the valves, solenoids, and passages shown in Figs. 1 and 2 (page 3) are an integral part of the governor base casting. Figure 2 illustrates the Low Pitch Relief Valve System and Feather Override System.

It is not possible at this time to disclose the details of the hydraulics of the new Hamilton Standard governors, Models 5U18-12 and 5Y20-2 which incorporate the features of the Low Pitch Relief Valve System and Feather Override System. We can, however, list the actions which occur by actuating the various controls (see box, page 4).

The Low Pitch Relief Valve System (Fig. 2) will operate as follows:

—For normal operation, the low pitch relief valve solenoid will be closed (cold circuit). This will allow the low pitch relief valve to relieve any inadvertent reversing pressures (over approximately 150 pounds) away from the reversing line to the propeller and back to the governor pilot valve; which will maintain the propeller actions without change. The approximately 150 pounds maximum pressure allowed by the relief valve in its normal relieving position will handle all propeller governing in the normal range, unreversing, feathering and unfeathering.

—For reversing, the low pitch relief valve solenoid requires ac-

## . . some qualified engineers belittle the effect of reverse thrust . .

tuation to open (hot circuit). Opening this solenoid will keep the low pitch relief valve closed by applying back pressures. This will allow the relatively high intentional reversing pressures of approximately 250 pounds to continue in the reversing pressure line to the propeller and they will not be relieved to the governor pilot valve.

—The Low Pitch Relief Valve System may be actuated by opening or closing the low pitch relief valve solenoid by moving a control that is located on the pedestal convenient to both pilots and close to the throttles. There should be a control for each propeller with a gang bar arrangement that is spring loaded forward and aft. The normal position of this control shou'd be forward except when reversing is desired. The position of this solenoid may be readily checked on engine runup. On takeoff the control may be placed forward manually and/or automatically by the forward movement of the throttles . This will allow the relief valve to relieve any inadvertent reversing pressures and lock the throttles out of the reverse quadrant until the throttles are returned to the idle position—only then as during a rejected take-off or after a landing (after the wheels are on the ground) should it be possible to manually actuate the control aft which will close the relief valve to allow intended reversing pressures and to open the throttle lock to the reverse quadrant.

—Other means of actuating the low pitch relief valve solenoid may be accomplished by connecting it to the up stroke of the landing gear handle for take-off and by a separate manual actuation for landing. On a double throttle system, such as Lockheed, it has been suggested that it may be connected directly to the reversing throttles.

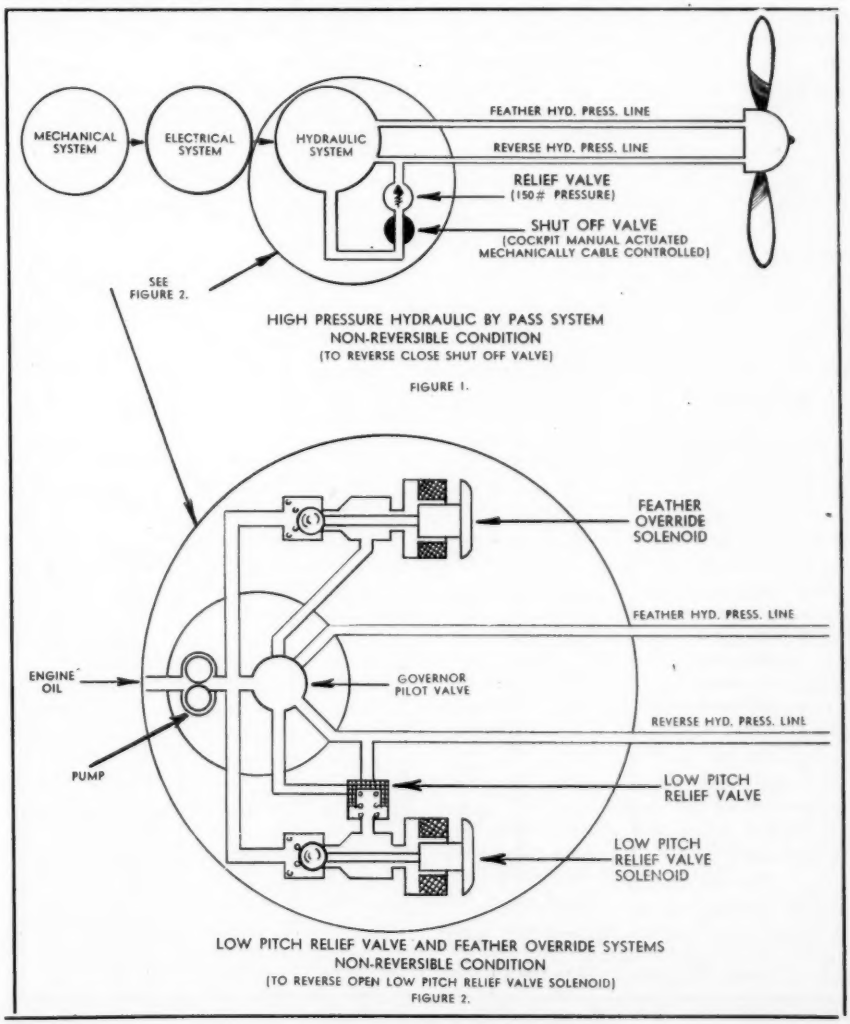
—A secondary movement of the above nature in the cockpit increases the fail safe qualities and is desirable when actions of catastrophic proportions are continuously imminent and when inaction or delayed action of the movement does not present a comparatively dangerous situation. Modern transports are certificated with either no or very little credit given to reverse thrust for stopping, so if the secondary movement does cause a slight delay, one will still be on the safe side by being able to use reverse thrust thereafter.

—It is disheartening that some qualified engineers belittle the effects of reverse thrust in flight. There have been some very well organized, planned and prepared tests of reversing a propeller of a 4 engined airplane under the very low horsepower output in the day time when one could see for miles and had altitude to spare and the aircraft had a light load. These same engineers would seem to compare the above described reversal with that occurring unexpectedly in a 2 engine airplane, at inadvertent full power, at low altitude, on an instrument take off at full gross weight into a black, rainy, and turbulent evening.

The Hamilton Standard Division developed and produced for service testing purposes this Low Pitch Relief Valve System. It has been satisfactorily bench and flight tested. The issuance of an airworthiness certificate for the new low capacity governor is expected. And ALPA has worked for over a year explaining and discussing the many aspects of the system.

The use or misuse of the system now lies in the hands of the Operators and Air Frame Manufacturers. Their job: To design and install a fool-proof system to actuate the low pitch relief valve solen-

(*Next Page*)



oid and to service test it in a complete and documented manner. There have been no offers. Progress was halted pending the CAA-ATA meeting early this year. At the meeting, airline representatives objected to the device becoming mandatory for present day transports. The ATA proposed to (1) lift the ground to the reverse pitch solenoid and make it a two wire circuit, or (2) install the Feather Override System on newly designed transports.

Installing the Feather Override System on future transports will not safeguard present day transports which will be in use for many more years.

—The Feather Override System is designed for feathering to have precedence at all times over all other functions or attitudes of the governor such as reversing, unreversing, normal governing, and unfeathering. It will be actuated by depressing the presently installed feathering button.

—ALPA originally recommended the installation of this device because it appeared at the time that it could be accomplished by making a few simple changes in the passages of the governor base casting and that it would quite naturally be used in conjunction with the Low Pitch Relief Valve System. This has not been the case.

—This system has developed into a complicated device requiring another lead and relay to the engine. As such it places us in the same position of being vulnerable to an inadvertent feathering now as we were previously to an inadvertent reversal. This device would therefore require isolation identical to that now made mandatory for the reversing circuits. Conversely, the additional lead and relay required by the Low Pitch Relief Valve is not vulnerable because if shorted, no change will occur in the propeller operation and therefore, it will not have to be isolated.

—The installation cost of isolating the Feather Override lead and associated hardware will be greater than the additional controls required for the Low Pitch Relief Valve System.

—This system will not prevent an inadvertent propeller reversal as will the Low Pitch Relief Valve System. The Feather Override System allows the inadvertent reversal to occur after which the pilot is expected to diagnose the problem and remedy the situation.

The Hamilton Standard Propeller Company has removed the Feather Override System as their standard article. They now agree to supply either the Low Pitch Relief Valve System or the Feather Override System or both systems or neither system according to the customer order.

—The Feather Override System will—with high power settings—require 2 overspeed conditions, going into and coming out of reverse before feathering. The Low Pitch Relief Valve will relieve any inadvertent reversing pressures from the reversing line to the propeller and will maintain the propeller action without change.

**Hydraulic Propeller Dome**

—Install in the propeller dome the heavy spring and heavy snap ring for the low pitch stop wedge.

—Placard cockpit, "Unfeather only in case of emergency." This was not accomplished, but the CAA did release a directive removing propeller feathering from proficiency checks due to the dangers involved if the unfeathering continued into reverse.

Place in all operating instructions: "When unfeathering, observe the propeller windmilling and not the tachometer."

**Electric Circuit**

—Rewire Hamilton Standard relay boxes and similar boxes so that inadvertent closing of number 2 throttle microswitch during unfeathering will not cause the solenoid valve circuit to remain energized after completion of unfeathering and cause reversing.

—Modify the Hamilton Standard reverse relay box and similar boxes by isolating the reverse solenoid circuit relay, contacts, connectors, etc.

—Provide a means for controlling the ground circuit for the reversing solenoid so that the solenoid will not be activated unless both the power circuit and ground circuit of the solenoid are closed.

—Redesign the No. 1 propeller blade switch and cam to provide for a more reliable operation and to safeguard against unfeathering to reverse.

(*Continued on Page 13*)

| | Auxiliary Pump | Feather Solenoid | Reverse Solenoid | Low Pitch Relief Solenoid | Action |
|---|---|---|---|---|---|
| 1. Normal Feathering | yes | yes | no | no | feather |
| 2. Feathering (pump only) | yes | no | no | no | feather |
| 3. Feathering (solenoid only) | no | yes | no | no | feather |
| 4. Normal Reverse | yes | no | yes | yes | reverse |
| 5. Reverse (no pump) | no | no | yes | yes | reverse |
| 6. Normal Unreverse | yes | no | no | no | unreverse |
| 7. Unreverse (solenoid only) | no | yes | no | no | unreverse |
| 8. | no | no | yes | no | no change |
| 9. | no | no | no | yes | no change |
| 10. | no | yes(2) | yes(1) | yes(1) | reverse, then feather |
| 11. | yes | yes | yes | yes | feather |
| 12. | yes | no | yes | no | feather |
| 13. | yes(1) | yes(2) | yes(1) | yes(1) | reverse, then feather |

Note: The parenthised numbers indicate order in which actuation accomplished.

Actions which occur by actuating controls.

Air Line Pilots look at the safety factors connected with

# Large Aircraft Operation

**and again make recommendations aimed at reducing effects of accidents of the survivable type.**

A few years ago, airline management and the Civil Aeronautics Board reached a decision that air travel should be made attractive to a greater proportion of the traveling public. A method was to lower air travel fares. High density seating suggested a method by which this could be accomplished.

It is important that the general public fly the airlines. They are the ones who have subsidized the development of our air transportation system and who are the market for its services. Air transportation today cannot justify itsef as only a luxury means of travel.

Aircraft will undoubtedly continue to grow in size and will carry larger numbers of passengers. The trend is economically favorable, for it reduces fares and brings the advantages of air travel to more people; creating growth in the industry. But as the seating capacity of aircraft has increased, the problem of emergency evacuation and survival of passengers in accidents has been aggravated. Reducing the instances of emergency evacuation and increasing the survival rate in such evacuation becomes a stern necessity.

Many steps can be taken *now* which will go far toward the solution of the problem.

Many of them are neither complicated nor difficult to implement. They break down into two groups:

—To eliminate the factors which lead to accidents which usually result in a need for emergency evacuation, and

—To increase the probability of successful evacuation should this type of accident occur.

**Eliminate Accidents.** A major cause of accidents which lead to emergency evacuation is the absence of vitally needed landing aids which air line pilots have long sought. Some of these are:

—Adequate Approach Lights. This landing aid can do much to prevent "overshoot" and "undershoot" accidents. A lack of approach lights, for example, was a contributing cause to the crash of a Pan American plane (see cut) at Shannon, Eire, on April 15, 1948. The CAB investigation determined that, "... It is apparent that the airplane would not have struck the ground short of the runway had the flight been able to establish clear visual reference to the field." Approach lights had not yet been commissioned at Shannon.

**Attend Your Council Meetings**

Airline pilots have been advocating the center-line approach light system for over seven years. In January of this year the system was adopted by the International Civic Aviation Organization, bringing it nearer to becoming an international standard. Standard approach lighting systems should be installed at major airports as soon as possible.

—Adequate Runway Lights. The need for efficient runway lights was demonstrated in the crash of a Northwest plane at Sandspit, B. C. The plane ditched off the end of the runway after attempting an emergency landing. Because the electric lighting system was covered by snow, the runway was lighted with less-than-helpful kerosene flare pots. The situation can be listed as a contributing factor to the accident.

—Adequate Runway Length. Aircraft construction is well ahead of airport construction. Runway lengths are often not sufficient under all operating conditions and present operational rules to accommodate today's aircraft with their increased landing speeds.

—Over-run-Areas. A distance of over-run area beyond the runway, free of obstructions (except for lighting standards designed so as to be easily knocked down) would do much to prevent the type of accident which requires rapid evacuation.

—Runway Marking. Adequate and standardized runway marking is a relatively inexpensive landing aid which requires painting strips, etc., on the runways, in the same manner that highways are painted for driving guidance.

With runway markings, pilots are able to determine how much runway remains for the roll-out after landing. ALPA's recommendations on the subject stipulate that the primary landing zone on each end of the runway shall be a standard length of 2,000 feet divided into four 500-foot sections. Markers, 75 feet long and 6 feet wide, would be placed at each 500 foot section. The first set of markers nearest the end of the runway would consist of two sets of four markers (8 blocks), the second set would be two sets of three markers (6 blocks), the third set would consist of two sets of two markers (4 blocks), and the last set would consist of two sets of single markers (2 blocks). In this way, by noting the number of blocks visible on touchdown, the pilot would be able to determine the amount of runway left for his roll-out.

**Evacuation Recommendations.** There are ways available *now* at little expense to increase the probability of getting passengers out of the airplanes in cases of survivable type accidents.

## . . . educate them to the means of survival . . .

Among ALPA's recommendations are:

—Getting self-help from passengers by educating them to the means of evacuation at their disposal. In all transportation accidents, the number of survivors depends to a large extent on the passengers' activities during the emergency. Passengers must be educated to utilize all available means of coping with the emergency. It is unrealistic to believe that passengers would be frightened by a display of literature which would show them how to save their lives in case of emergency. It appears senseless to go to the expense of designing emergency equipment and exits; then keeping the passengers in the dark about their operation and location.

Between 1949 and the end of 1952 only two of the six water landings by airliners were accomplished without fatality. Examples are the accident of a DC-4 at Sandspit, B. C. and the recent San Juan ditching of a DC-4. In both instances the airplanes floated after the impact. It was evacuation procedures and equipment which were lacking. More adequate provision for evacuation and survival at sea may have reduced or eliminated the loss of life in both instances. ALPA's ditching recommendations include: Life rafts to be located so they can be jettisoned into the water from a compartment opening from the outside of the aircraft. A line to connect life rafts and aircraft so the rafts will not float away. A line to be attached to air bottles on the rafts so that the pressure of the line will release the air and inflate the rafts automatically. Rafts to be placed on both sides of the aircraft in the event that evacuation is impossible from either side.

**Schedule With Safety**

A method of educating passengers to these procedures and equipments would be to place displays of emergency equipment at the air terminals; and literature on board the airplanes. No entire load of passengers is made up of "first time riders." A great number will be repeat customers familiar with the displays and literature who could be counted on as leaders or helpers in case of emergency.

—Supply an adequate number and type of exits. The usefulness of existing exits often becomes compromised by the arrangement of seats and the cluttering of areas through which the passengers must walk.

The advantages of walk-out type exits at floor level over those of the window type is apparent; as is the need for adequate restraining devices on the seats to eliminate serious impact injuries.

—Adequately light and mark with evacuation instructions all emergency exit and equipment locations. And provide spark-proof flash lights to illuminate emergency exits, which will light automatically on impact and which can be turned on manually on take-off and landing.

—Provide a reasonable ratio of passengers to crew members. One flight attendant to assist in the evacuation of 50 to 80 passengers is beyond reason yet the situation exists today.

(*Continued on Page* 13)

At Philadelphia: A few more feet of runway or an over-run area would possibly have prevented the damage . . .

# ALPA Mutual Aid PLAN

**A staff member of ALPA's Mutual Aid Committee discusses the theory behind mutual benefit societies.**

**By Ronald L. Oakman, ALPA Research Director**

The ALPA Mutual Aid Plan which will soon be presented to members is the answer to a very fundamental need resulting from the impersonal nature of modern life. Anyone who has spent any time in one of our large modern cities and mingled with the crowds throronging the over - crowded streets is aware of the tremendous change that is taking place in our way of life. Every day we are impressed in some new way by the tremendous progress of applied science in and out of the air transport field. Yet, no one knows better than a pilot that this thing called "progress" is a two-edged sword. With each new advance in civilized living, some homely virtue possessed by our ancestors is lost. The genius of American industry has created great urban centers in which millions are dependent on weekly or monthly wages but it has at the same time weakened or destroyed that feeling of security that was a characteristic possession of the man close to the soil, who knew his fellow townsmen and his fellow workers like brothers.

The possibilities of loss of earnings due to extended illness or injury are as prevalent today as they were in more primitive times and the man who is an IBM number on a company voucher cannot count on the friendly community "barn raising" type of help which fortified the small townsmen of yore. Mutual Aid Plans are born of his modern need and recognition of the fact that while a man's life is today less intimately associated with his fellow-worker the possibilities for mutual "barn raisings" are even greater. By spreading catastrophy over larger numbers the individual contribution required as an off-set is greatly reduced. This is no new idea, for fraternal organizations throughout the land have engaged in some form of mutual aid or assistance for many years.

Some people point to these fraternal mutual benefit societies as awful examples which illustrate vividly that such activity is economically unfeasible. Small groups in the past have banded together for self-insurance purposes and as they grew collectively older and as their membership fell the burden on the handful of survivors became ultimately prohibitive. Labor unions, lodges, and religious orders have all experienced this actuarial tragedy and their experience has prompted some to argue that only scientifically administered and actuarially sound professionally insured plans will work satisfactorily.

The ALPA Mutual Aid Plan soon to be launched cannot be compared to this fraternal self insurance described above — neither is it a cold-nosed planned-for-profit, professional insurance plan. Rather it is a combination of the best features of both of these. Considerable experience has already been accumulated under the plans in effect on various individual air lines. American has had its own Mutual Aid Plan for over 12 years. TWA, Braniff, C and S, Delta, and Eastern have likewise had such plans for many years. Experience under these plans indicates beyond a doubt that for a nominal fee (as low as $2.00 or $3.00 per month) to the individual member, over a half million dollars has been distributed over the years in the form of benefits to ailing members who would have indeed been in a sad way facing disaster alone. Experienced insurance brokers have told us that the rigidity of insurance laws and the expense of professionally administering such plans make it impossible for them to come anywhere close to the cost experience records of these Mutual Aid Plans now in effect. Since the ALPA Mutual Aid Plan is designed only to protect income during crucial years of normal employment (maximum age 60) and is, therefore, not a cradle-to-grave proposition it escapes the obvious expense trap built into the fraternal society mutual insurance plan. It is a middle of the road "barn raising" safeguard against disaster which when mutually shared gives relief from strain and worry at bargain rates. Complete details on the ALPA Mutual Aid Plan — an association-wide plan approved by the Convention — will be released as soon as they have been approved from a legal standpoint. Every precaution is being taken to make this a sound as well as a humane plan. Membership will be kept on a purely voluntary basis, but, of course, the broader the participation the lower will be the individual cost and it will contribute much to ease of mind in the cock-pit when every pilot is protected against that long-shot chance that misfortune may knock at his door next.

# Camera

Williams

The first meeting of ALPA's newly formed Executive Committee was held at the Home Office, February 17-20. The Committee, created by the Association's revised Constitution and By-Laws consists of Regional Vice Presidents A. F. Foster (Region I), W. T. Babbitt (Region II), M. E. Swanson (Region III), L. R. Williams (Region IV), and C. A. Peternell (Region V), plus ALPA President C. N. Sayen, First Vice President J. Wood, Secretary F. A. Spencer, and Treasurer L. Hincks.

Spencer

Swanson

Wood

Paternell

Sayen

Hincks

Foster

Babbitt

# News

## ALPA Committee In Seminar On Douglas DC-7

An invitation from Douglas Aircraft for a Technical Pilot Committee to review Douglas' plans for the DC-7 resulted in a three day visit to the Santa Monica plant, February 4-5-6.

As is generally known the DC-7 is very similar to the DC-6B. Main physical differences are the increased fuselage length of 40 inches, new type more powerful Wright-built turbo compound engines, and four bladed propellers.

A few of the high light features of the new airplane are as follows:

—For maximum protection of strategic zones, 88 per cent of the aft nacelles of the DC-7 is guarded by titanium structure and skin. In addition to its increased strength at high temperatures, a substantial weight saving is realized through the use of this new metal.

—A feature the pilots appreciate is that the main landing gear of the DC-7 can be used as an effective speed brake. This equipment is designed to be lowered at airspeeds up to 410 MPH at 20,000 feet (Vi=300 MPH).

—To prevent ice-inducing moisture particles from entering the carburetor, Douglas has designed a new carburetor for the DC-7 airscoop. This scoop features an alternate air intake for use during most icing conditions. The alternate air intake has all the advantages of an under-cowl scoop plus excellent ram recovery characteristics. Only during the most severe icing would carburetor heat be needed.

Use of the Cleveland NACA refrigerated wind tunnel was made to test the new scoops in simulated icing conditions in level flight, climbing and descent angles. Data gathered indicated satisfactory performance from the scoop that features a new approach in the design of carburetor air scoops.

—Of interest is the new Wright turbo compound engine. Claims of fuel economy with this new type engine should help long range flights. Fuel consumption .385 SFC; pounds per HP is 1.08; 3250 HP for take-off. Eighteen hundred HP for high blower cruise.

Development in 1942 and military production since 1949 indicates a substantial time for development and service testing the new power plant. However, it is generally conceded that airline flying is required to determine reliability of any new product.

All the pilots in the ALPA Committee are DC-6 and DC-6B pilots and their interest in obtaining comparative performance data of DC-6B to DC-7 resulted in the following:

| DC-6B | DC-7 |
|---|---|
| Engine<br>P&W R2800<br>CB16<br>2400 HP (wet) | Engine<br>Wright<br>R-3350 DA<br>3250 HP (dry) |
| Power Loading at<br>100,000 lbs.<br>10.43 lbs/HP | Power Loading at<br>117,900 lbs.<br>9.0 lbs/HP |
| Wing Loading<br>at 100,000 lbs.<br>68.3 lbs/sq.ft. | Wing Loading<br>at 117,900 lbs.<br>80.5 lbs/sq.ft. |
| S.L. Take-off Field Length (prop windmilling) 5720 ft. | S.L. Take-off Field Length (prop windmilling) 6060 ft. |
| Climb one engine inoperative (second segment at 100,700 lbs.) 465 ft/min | Climb one engine inoperative (second segment at 117,900 lbs.) 550 ft/min |
| S.L. 3 engine enroute R/C at 100,000 lbs. 530 ft/min | S.L. 3 engine enroute R/C at 117,900 lbs.) 680 ft/min |
| Landing Field required at 85,000 lbs. is 4990 ft. | Landing Field required at 95,000 lbs. is 5510 ft. |
| Stalling Speed (Flaps full down at max. landing weight) 93.5 MPH | Stalling Speed (Flaps full down at max. landing weight) 99.0 MPH |

Regarding the above estimated performance figures, the pilot group views favorably the decrease in power loading and the higher rates of climb with an engine inoperative. However, the higher wing loading and higher stall speed requires longer runway lengths that will tend to restrict the airplane's efficiency at some airports.

Those present from Douglas Aircraft to discuss the DC-7 with the ALPA Pilot Committee, as indicated in the picture on cover are seated clockwise, Captain Louis Meredith, AA Council No. 39, Engineering and Air Safety Chairman; Captain H. G. Portman, UAL, ALPA Regional Vice President and Chairman of UAL Engi-

The wing and fuselage of the DC-7 were joined at Douglas' Santa Monica plant this month. The piston-powered transport is slated to take to the air in March. The DC-7 will have a top speed of over 400 mph and a 360 mph average cruising speed. It is more than eight feet longer than the DC-6 and will seat from 60 to 95 passengers, depending on the seating arrangement. Fifty-eight DC-7s have been ordered; 25 to United, 25 to American, 4 to Delta, and 4 to National.

neering and Airworthiness Committee; A. H. French, Hamilton Standard Propeller Company representative; Captain A. W. Stainback, UAL, Engineering and Air Safety Chairman, Council No. 34; G. V. Christy, Wright Aeronautical Engine Company representative; Theo. G. Linnert, ALPA Engineering; and Captain Chas. H. Ruby, NAL, Safety Chairman. Standing are Johnny Martin, Douglas Chief Test Pilot; Jack McGowen, Chief Project Engineer for DC-6 and DC-7 airplanes and J. J. Dysart, Assistant Chief Project Engineer.

In addition to performance information, the pilot group received information on all the DC-7 functional systems which are basically the same as the DC-6B systems. Also DC-6 and DC-6B problems were discussed.

At the close of the DC-7 familiarization program, some time was spent by the pilot group reviewing Douglas planes for a DC-8 jet airliner.

A copy of ALPA "Turbine Powered Transport Airplane Design and Operating Recommendations" compilation was given to and reviewed briefly with Chief Test Pilot Johnny Martin.

## Career Booklet

Captain R. F. Adickes, TWA, with two other pilots, recently compiled and published a booklet, *How To Become An Airline Pilot*, which gives advice on school subjects, obtaining flight instructions, and other preparatory material for boys interested in a flying career. One chapter covers ALPA and its history.

The booklet is available through airplane modeling magazines and arrangements are being made for its distribution to air minded Boy Scouts and other groups of teen age boys.

## CAA Asks 45 Million

The Civil Aeronautics Administration announced this month that it is looking for a special 45 million dollar appropriation from new Commerce Secretary Sinclair Weeks to complete installation of navigation and traffic control aids for civil and military users.

The money would be used to implement the recent recommendations of the Special Airport Commission made during the Truman administration.

CAA says installation and adequate manning of radar traffic control systems would be given high priority. The appropriation is being sought under the Commission's recommendation for a speed up of "research and development programs and installation projects designed to improve aids to navigation and traffic control in the vicinity of airports . . . "

First on the list, says CAA, would be the installation of air navigation aids.

## Sayen Appointed To NACA

ALPA President Clarence N. Sayen accepted an appointment to serve as a member of the National Advisory Committee for Aeronautics on Operating Problems for the year 1953. The Committee will study aircraft operational problems requiring research and make recommendations to the NACA.

NACA was established by Congress in 1915 and consists of 17 members appointed by the President to include the heads of the U. S. Air Force, Naval aviation, Research and Development Board, Civil Aeronautics Administration, National Bureau of Standards, Weather Bureau, and Smithsonian Institution, together with non-Government scientists and aeronautical experts. The Committee is authorized to conduct research and experiment in aeronautics in laboratories placed under its direction, and to encourage and support research in scientific and educational institutions by means of research contracts.

## In Memoriam

**William D. Schoensee**

**of Central Airlines, died in crash of an Air Force T-6 while acting as instructor on training flight near Hondo, Texas.**

**James L. Singleton**

**of Southern Airlines, died of a heart attack on December 19, 1952.**

**Robert C. Durlin**

**on military leave from United Airlines, was drowned while swimming off Wake Island.**

**Charles F. Greber**

**of Flying Tiger Air Lines, died January 7, 1953 in crash near Seattle, Washington.**

## Flight Time Hearings Postponed

Hearings before the CAB scheduled for February 26, 1953, on flight time and duty time limitations for pilots have been indefinitely postponed.

In issuing the postponement order, the CAB separated flight time limitations from duty time limitations. While the flight time hearings have been indefinitely postponed, the CAB has proposed to amend the Civil Air Regulations to limit the scheduled duty time of flight crew members in any 24-hour period. Comments on the CAB Draft Release are due April 21, 1953. The Draft Release has been circulated by ALPA to all Central Air Safety Committee Chairmen and members of the ALPA Engineering and Airworthiness Advisory Committee.

## Cutrell Named to ACC Subcommittee

ALPA President Clarence N. Sayen named Ernest A. Cutrell, American Airlines, to the newly formed National Standards Section of the Aerodromes, Air Routes and Ground aids Subcommittee and Air Coordinating Committee, February 18, 1953. The Subcommittee, under the direction of Joseph D. Blatt, was formed to draft national standards for visual aids for air navigation.

The first two tasks for the Subcommittee will be the development of a national standard for an Approach Lighting System and systems of runway markings. After completion of these standards, the Subcommittee will develop standards for runway lighting, taxiway guidance signs, taxiway lighting, etc.

## Jensen Pilot Representative at ICAO Meeting

Walter A. Jensen, American Airlines, represented ALPA and IFALPA at the ICAO Air Naviga-

tion Conference in Montreal, February 24, 1953.

On the agenda of the meeting for discussion were:

—Traffic control problems including the use of radar.

—Aids for Approach and Landing. Consideraton of problems attached to landing under poor visibility conditions.

—Visibility and height of cloud base at airports. The Conference worked on methods of obtaining visibility and cloud base information in a form which will aid the pilot to assess the conditions he will encounter during the critical approach period.

—Standard holding patterns. The Conference worked to devise standard holding patterns for the various types of instrument landing aids.

## Horse Power Ratings To Type Ratings

On August 27, 1952, the CAB adopted a new paragraph to section 21.24 of Part 21 of the Civil Air Regulations providing that all airline transport pilot certificates showing horse power ratings would expire on May 1, 1953. The provision, however, provided that such valid certificates could be exchanged for new certificates with type ratings. The exchange would be permitted without a further showing of competency when the applicant had either passed an official rating test or had served as pilot in command on the particular type aircraft for at least ten years since May 1, 1949.

Difficulty has been encountered where applicants are presently employed as copilots and hold airline transport pilot certificates with appropriate horse power ratings. Although such applicants have received the required training and checkouts and in many cases the same 6-month check and training as given pilots-in-command, their accumulated flying time cannot be credited as pilot-in-command time. As a result, they are unable to meet the 10-hour pilot-in-command time requirement for type ratings.

The Board has ruled that for the purpose of converting horse power ratings to type ratings the accomplishment of an appropriate pilot training program provides an equivalent level of safety to that provided by either the pilot-in-command or the official rating test.

As a result, the Section as amended, provides that the Administrator shall exchange present airline transport pilot certificates with horse power ratings for new certificates with type ratings where the certificate holder presents reliable evidence that he has successfully accomplished, in that type aircraft, a pilot ground and flight training program acceptable to the Administrator.

**Air Line Pilots Association Federal Credit Union Financial and Statistical Report January 31, 1953**

**BALANCE SHEET**

**Assets**

| | January, 1953 |
|---|---|
| Loans | $291,602.95 |
| Cash | 109,267.27 |
| U. S. Bonds | 298,185.17 |
| Furniture & Fixtures | 2,943.56 |
| Prepaid Expense & Misc. | 520.02 |
| Total | $702,518.97 |

**Liabilities**

| | |
|---|---|
| Shares | $685,874.05 |
| Reserve for Bad Loans | 13,044.33 |
| Undivided Profits | 2,680.84 |
| Profit | 672.75 |
| Accounts Payable | 247.00 |
| Total | $702,518.97 |

**STATEMENT OF INCOME & EXPENSE**

**Income**

| | January, 1953 |
|---|---|
| Interest on Loans | $ 2,954.42 |
| Investment Income | |
| Other Income | |
| Total | $ 2,954.42 |

**Expenses**

| | |
|---|---|
| Salaries | $ 1,319.24 |
| Office Expense | 61.30 |
| Educational Exp. | 39.59 |
| Loan Insurance | 219.32 |
| Depreciation | 62.72 |
| Misc. | 579.50 |
| Total | $ 2,281.67 |
| Net Profit | $ 672.75 |

**Statistical Information**

| | January, 1953 |
|---|---|
| Number of Members | 2,201 |
| Number of Potential Members | 10,898 |
| Loans made since Organization (Number) | 2,178 |
| Loans made since Organization (Amount) | $1,336,115.04 |

## New Study By McFarland

Dr. Ross McFarland has recently published a work titled, "Human Factors in Air Transportation," which touches on many subjects of vital interest to pilots and operators.

Of particular interest to pilots is the subject of smoking in flight. At an altitude of 12,000 feet, according to Dr. McFarland, three out of four cigarettes smoked by the pilot can raise his physiological altitude to 16,000 feet. The effect of this change is probably felt most keenly during night flights when maps and instruments must be read in a darkened cockpit.

Dr. McFarland points out that a very small percentage of airline operators take the precaution of providing a medical staff in their headquarters buildings or at their operating bases. He feels that this would actually be an economy measure, rather than an expense.

Dr. McFarland points out that in 22 years of flight only 91 inflight deaths have occurred, in spite of the fact that many of the passengers carried during this period were elderly or even ill.

An arresting bit of information contained in the book was the fact that since 1950 the airlines have experienced eight cases of rapid decompression. Before 1950, in a million hours of flying, only ten cases were reported. Dr. McFarland explores the dangers which accompany high altitude flying and suggests preventative medical and design factors which should be considered.

Pilots over 40, says Dr. McFarland appear to have fewer accidents, probably due to the superior experience. The author presents some suggestions for determining possible physical failings and offers some possible methods of prolonging the usefulness of pilots nearing maximum flying age. He is concerned over the fact that the air transport industry runs 25th out of 40 industries in ground accidents. He emphasizes that care should be taken in hiring personnel and outlines tests and training programs which could reduce this unfortunate statistic.

**Next Month . . .**

**ALPA Recommendations for a Jet Transport**

## Twelve Ways to Kill an Association

(Reprinted Australian Air Pilot—July, 1952)

—Don't come to its meetings.

—If you come, come late.

Never accept an office—it is easier to criticise than to do things.

—If asked by the Chairman to give your opinion regarding some important matter, tell him you have nothing to say. After the meeting tell everyone how THINGS ought to be done.

—Do no more than is absolutely necessary, but when other members roll up their sleeves and willingly use their abilities to help things along, howl that the Association is run by a clique.

—Hold back your subscription as long as possible.

—If you don't receive a bill for your subscription, don't pay.

—If you receive a bill for your subscription after you have paid, resign from the Association.

—If you receive service without joining, don't think of joining.

—When you attend a meeting, vote to do something and then go home and do the opposite.

—Agree to everything said at the meeting and disagree with it outside.

—When asked for information, don't give it.

## Large Aircraft

(*Continued From Page 6*)

—Check periodically to determine if evacuation procedures and crew training in evacuation procedures are adequate.

—Provide flight attendants with sturdy seat and shoulder harnesses. The importance of keeping the flight attendants uninjured in the event of accidents cannot be over emphasized. Because of the flight crew's position —forward—they cannot be counted on to assist passengers in the evacuation. Without attendants the passengers have no assurance of trained leadership.

—Tighten up on runway snow removal and treatment of icy runways. More than one airplane has been lost due to snow and ice on the runway. A recent example: CAB reported the probable cause of an Eastern Air Lines accident at Boston as "inadequate snow removal."

—Better correlation of operations with aircraft features and airport aids. An aircraft with reverse propellers can operate with greater safety on slippery runways. Extra precaution against dispatching aircraft without reverse propellers into such airports suggests a means of reducing "overshoot" accidents.

Said CAA's Chief of Technical Staff, David L. Posner, on January 29, 1953:

". . a study has been made covering a period from 1947 through August, 1952. During this span there were 39 accidents which might have been prevented or at the very least made less severe had propeller reversing been available. These accidents resulted in 93 fatalities and 26 major injuries. . . "

Similarly, dispatching aircraft into small airports without adequate landing aids exposes them to both "undershoot" and "overshoot" accidents.

—Provide a well equipped and well trained fire fighting force at all airports where large aircraft operate. A great number of the accidents where rapid evacuation was necessary have occurred at or near airports.

—Provide airline aircraft with the "non-skid" wheel braking devices now on the market. The brakes would help high speed aircraft to stop on short runways. In addition, non-skid brakes prevent blown out tires which may result in fires.

It is reiterated that most of the foregoing recommendations could be implemented immediately. At least two flight attendants could be assigned to all flights carrying over forty passengers within a few days. Passenger education can go ahead immediately. Other available steps to prevent evacuation type accidents and to increase the survival rate when they occur should be implemented without delay. The emergency evacuation problem is by no means confined to the high density aircraft. The high density seating development has merely dramatized and aggravated the problem. The air transportation industry faces an immediate necessity of increasing the survival rate in the emergency evacuation of aircraft and to provide air transportation for a greater portion of the traveling public without reducing the standards of safety offered.

## Propeller Reversing

(*Continued From Page 4*)

—Install an additional switch in the reversing solenoid circuit which will prevent the application of power to the circuit until the switch has been closed by operation of the landing gear actuated throttle reversing lock system.

—Rewire the feathering button circuit so that the wire from the feathering button to the fixed terminal for the auxiliary pump on the "A" relay is not energized when feathering is being accomplished and so that the hold in coil on the feathering button is inoperative during unfeathering.

### Electric Circuit Installation

—Isolate the reverse solenoid circuit wiring in one of the following ways:

A. Physically isolate wiring from all other circuits.
B. If wiring is run in bundles with other wires, a shielded wire is to be used. The shielding shall be grounded at both ends and a protective cover shall be provided over the shielding.

—Isolate the reversing circuits at terminal strips as follows:

A. Use continuous wiring to eliminate all connections at terminal strips.
B. Provide separate covered terminal strip for reversing lead connections.
C. Inclose in insulating cover that will hold wire secure in case of breakage.

—Isolate the reverse circuit multiple pin connectors in one of the following ways:

A. Use continuous wiring to eliminate pin connectors.
B. Provide separate pin connectors for each reversing solenoid circuit.
C. Deactivate all pins adjacent to the one carrying the reverse solenoid circuit in multiple pin connectors.

—Isolate certain solenoid lead studs, terminals, and associated hardware from all other near-by studs or terminals by enclosing these components in an insulating cover which is so designed or secured to the wiring that the wiring will stay in place in case of breakage at the terminal or so that the broken wire and terminal will remain insulated by the cover from contact with other circuits if the

wire comes off its terminal. The nature of the cover design or provisions for its attachment must be such that its installation will not be overlooked during maintenance.

—Modify the pressure seal disconnect in one of the following ways:

A. Use continuous wiring to by-pass pressure seal.
B. Provide a separate conductor for the reversing solenoid lead.
C. Deactivate pins adjacent to and provide an insulating shield for reverse solenoid pins on both sides of the pressure seal.
D. Cover the socket and wire terminal of solenoid valve lead insert with insulation.

—Prevent reversing of a normally operating propeller when unfeathering another propeller by isolating the two circuits from each other.

—Blade switch circuit slip ring and insulator assembly and associated circuit components should be treated to prevent leakage due to moisture absorption.

—Redesign to improve the reliability of landing gear switches.

**Throttle-Pedestal Design**

—The reverse safety switches in the pedestal should receive an electrical check every 350 hours of service.

—The throttle-pedestal mechanism should be so designed that an entirely separate mechanical motion of the throttles should be required for reversing other than those required for landing. This additional mechanical motion should not be possible unless the forward thrust throttles are in the forward idle position and it should remove mechanically the positive lock-out of the throttles to the reverse quadrant.

The Lockheed Constellation double throttle arrangement appears to be the best design so far exhibited. It would be desirable for the reverse throttle knobs to be square with round corners and the forward thrust throttle knobs to be round.

The Boeing 377 lift type throttles appear to be second best design so far exhibited. It would be desirable for them to have at least 3/8 inch to lift, a reverse taper on the stop to prevent bouncing over same, and a means whereby the throttles cannot be lifted until they reach the positive idle position. The main objection to this type of system is that if one were reducing power in a thunderstorm condition and at the same time was bounced upwards, the throttles would continue up and aft and possibly go into the reverse quadrant.

The detent type throttle system is the type we considered as unsatisfactory. The weight of one's arm has been sufficient to cause inadvertent propeller reversing. We recommend that a hinged plate be installed as a temporary measure on the pedestal behind the throttles until a better throttle actuated means of removing the throttle lock-out to reverse quadrant can be designed.

—Prevent excessive deflection of lock assembly components.

—The "reverse operable" warning device shall be clearly visible when the lock is open just a sufficient amount to permit pulling the throttles into the reverse regime.

—Conduct individual throttle pull testing to check the solenoid mechanism.

—Install a more noticeable flag arrangement than the present extension of the reverse pitch solenoid over-ride handles.

—Check the relationship between the position of the pedestal strikers whenever operations are performed which may affect the relative position of the solenoid lock and throttle switches.

—Modify the reverse throttle switch and lock bar assembly by adding a stop pin and plate for the lock bar and cutting clearance notches on No. 1 and No. 4 switch triggers.

—Provide protection against possible fouling of the throttle switch lock actuating cable and turnbuckle when the cable is slack as a result of manual operation of the warning flag.

—Install throttle pedestal cover plate which has a steel track to prevent lifting the throttles before they reach the forward thrust idle position. Also increase the height of the throttle quadrant stop.

**Warning Lights**

—Reverse warning lights or thrust indicators shall be installed on all aircraft equipped with reversible propellers. The lights shall indicate only an intransit to reverse position or in the geometrical reverse pitch position. The lights shall be actuated by propeller blade angle switches.

These lights may have 2 uses. They may be used to indicate an in flight inadvertent reversal in which case the intransient reverse lights, which are actuated just below the low pitch blade stop setting, are most desirable. They may also be used to indicate on the ground whether the propellers are in the reverse position and more power can be applied in reverse in which case the reverse position lights, which are actuated below the geometric reverse pitch position, are most desirable.

ALPA recommends that further study be given to thrust indicators and that intransient reverse lights be installed on all aircraft equipped with reversible propellers that are equipped with 3 slip rings, because the intransit reverse lights are deemed the most desirable indication, for they give the pilot the most advance warning of impending trouble.

The ALPA Committee has felt that complete protection from an inadvertent propeller reversal during a critical condition of flight would never be possible until there is available a device placed ahead of all the other components (electrical, mechanical, hydraulic) of the reversing system to stop reversal except when desired by the pilot. The Committee has felt that the low pitch relief valve comes the closest to providing this positive protection under the control of the pilot. The re-works of the reversing system and the recommendations which have been made are designed to reduce the number of incidents of unwanted reversal. The feather override provides the pilot with a means by which he may, if he can diagnose the situation and has the time available, feather the propeller out of reversal. The low pitch relief valve is to protect against reversal itself as a result of a failure of other components. Many industry people have opposed the low pitch relief valve, contending that the other recommendations reduce the probability of reversal and that the low pitch relief valve in addition is in effect "piling safety on top of safety." The ALPA Committee has felt that an unwanted reversal can create a hazard of sufficient proportions that we cannot have too much protection against it.

*A Message from*

# The American Heart Association

**help your Heart Fund . . .**

**Help your HEART**

• The unrelenting, continuous campaign of the American Heart Association against heart and circulatory diseases is of such scope and importance as to require the support of the entire nation. Consequently it is most encouraging to see that organized labor, representing as it does such a large segment of the population is meeting the challenge.

• Today, a very large majority of the nation's trade unions are doing their share in the fight against heart disease. With the unflagging support of the nation's unions, labor has identified itself fully with this all-important campaign to preserve and extend human life.

• We cannot emphasize too strongly the indispensability of such mass support to the program of the American Heart Association. For despite very significant advances in heart research, public education and community services, heart disease is still a most formidable opponent, making increasing inroads in the nation's health. Figures for the year 1951, the latest available, show that deaths from heart disease have reached a peak of 763,000. In addition, there are approximately 10,000,000 Americans afflicted with heart and circulatory disorders. As the infectious diseases decline in importance, heart disease becomes more and more of a problem in an aging population.

• Neverless, there are some very encouraging developments. Real progress is being made in the fight to bring the heart disase under control. New techniques and new discoveries are being produced with increased rapidity. In order to step up the rate of inquiry and discovery, the American Heart Association has instituted a new program of lifetime support for outstanding researchers. In this way, they will be able to concentrate all their energies for years to come on the various aspects of the problems, and increase the speed with which new discoveries are uncovered and new information made available.

• At the same time the American Heart Association is constantly expanding its specialized community service, in cooperation with hospitals, cardiac clinics and social agencies. Through its affiliates the Association sponsors and participates in such services as work-classification clinics, rehabilitation-vocational guidance, therapy, sheltered work shops, case finding studies through mass chest X-ray examination, kitchen efficiency studies for cardiac housewives, and rheumatic fever programs to aid heart disease sufferers. Wage earners in particular benefit from the work-classification programs which help determine the employment potential of cardiac patients. These programs have already shown the soundness of employing such disabled workers.

**$10,000,000 needed to Expand this vital program**

• A steady stream of educational programs, booklets, films, slides, lectures, exhibits, and other materials are made available in order to help disseminate important information to the public, on how to deal with the problem of heart and circulatory diseases.

*"In this world nothing is certain but death and taxes . . ."*

*Benjamin Franklin*

We are today all too familiar with the subject of taxes . . . aware also of the HIDDEN TAXES which increase our daily cost of living. We must all pay them, and there is no way they can be avoided . . . but

YOU CAN AVOID HIDDEN INSURANCE COSTS. The Franklin Life is the first company to provide flight personnel full coverage life insurance at standard rates.

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